Chapter-I

INTRODUCTION

Cost of capital is one of the basic concepts in finance. It is used as basic input in almost all financial decisions. It helps in making sound and logical financial decisions and thereby facilitates the maximization of value of the firm. Thus, it links the firm’s long term financing and investment decisions with the wealth of the shareholders as determined by market price. Accordingly measurement of cost of capital has become an important part of financial management of a concern. The policy of liberalization since 1991 has opened up many avenues for the companies to float public issues as well as for the investors to invest in securities of leading but hitherto closely held companies. New instruments such as growth bonds, millionaire bonds, pension bonds, floating interest rate bonds and warrants, etc., offering wide choice to investors have been introduced as alternative measure of raising finance by Indian companies.

A financial manager has to take three important decisions. These decisions are classified as investment decision, financing decision and dividend decision. Cost of capital is defined as minimum rate of return required on investment projects to satisfy the claims / expectations of suppliers of funds in terms of regular payments. Suppliers of funds can be classified into two categories- lenders and owners / shareholders. From lender’s point of view cost of capital is the interest rate at which they have granted loans. From the point of view of shareholders, cost of capital is the earnings / dividend rate required to maintain the present market value per share. Thus ignoring taxes and floatation costs, the cost of capital represents two sides of the same coin-the cost to issuers is the return to investors. The cost of capital plays an important role in the choice of a project, financing and dividend decisions of a company. For investment decisions, cost of capital serves as a yardstick for measuring the profitability of investments. An important use of cost of capital is in the area of capital budgeting. An inter-relationship exists between capital budgeting and cost of capital. For example, to determine the size of the capital budget corporate managers need information about
both the expected return on investment opportunities and the expected cost of proposed capital. In capital budgeting, it is used as discount rate in the computation of net present value or as the cut off rate for comparison with internal rate of return of projects. A cut off rate is that rate below which no project involving capital expenditure should be accepted. If the rate of return of a project is expected to be less than cut off rate, it would be better for a concern not to invest its funds in the project (Porwal, 1976). Secondly, cost of capital is used in designing capital structure of an enterprise. Capital structure decisions have an effect on the financing mix of the firm which in turn affects its overall cost of capital (K_o). In building up its capital structure over a period of time, a firm will depend upon that line of financing which involves minimum cost. Thirdly, the cost of capital plays an important role in the field of evaluating financial performance of top management. It helps in allocating capital funds within an enterprise. It serves as yardstick for measuring profitability of investments (Bhattachary, S.K. 1970). Finally, dividend policy decisions influence the amount of earnings distributed to shareholders or retained by the firm to finance future growth. Dividend policy has impact upon the return required by investors and the firm’s cost of capital. Thus it can be said that cost of capital acts as nucleus in the framework for financial management decision making (Kuchhal, 1986).

Thus the main function of cost of capital is to provide a correct and objective criterion by which management can determine whether it should or should not accept available proposals involving capital expenditure. From the above it is implied that the shareholders funds, raised by issuing shares and or by retaining net earnings, should be so utilized that the firm earns return on them, at least greater than the return expected by the shareholders with a view to maximize their wealth. In case an enterprise fails to earn the required rate of return, the market value of shares will fall and overall wealth of shareholders will be reduced.

The funds raised by issue of debt and preference share capital should be used only when they do not reduce the market value per share. The market value per share will remain unchanged by issue of debt and preference share capital, if enterprise earns, at least, a rate of return on the projects financed by these funds equal to the cost of such
funds. It means cost of capital is simply the rate of return which the funds, when used should produce to justify their use in the firm in the light of wealth maximization objective. Thus the cost of capital has been defined as the rate of return which the firm must earn on its investments so as to leave undamaged the interest of the stockholders. *(Friedland, 1966)*

In nutshell cost of capital can be stated as rate of return which a firm must earn to justify the use of capital within the firm, taking care of objective of wealth maximization. The cost of capital has direct relationship with risk involved in a firm. Generally higher the risk involved in a firm, higher is the return expected by investors from it and consequently higher the cost of capital for it. Different experts have defined cost of capital in different ways. According to Milton H. Spencer, “The cost of capital is the minimum rate of return which a firm requires as a condition for undertaking an investment”. Ezra defines it as, “The minimum required rate of earning or cut off rate for capital expenditures”. In the words of Vanhorn, “Cost of capital is a cut off rate for the allocation of capital to investments of projects. It is the rate of return on a project that will leave unchanged the market price of the stock”. Hampton asserts, “Cost of capital is the rate of return that a firm requires from investment in order to increase the value of firm in the market place”. Gordan defines it as, “A discount rate with the property that an investment with a rate of profit above or below this rate will raise or lower the value of the firm”. In the words of G.S. Philippatos, “The cost of capital is the minimum rate of return, the hurdle or the target rate, the cut off rate of the financial standards or performance of a project”. From the definitions given above three basic aspects of cost of capital can be concluded. First, cost of capital is not a cost as such in fact it is the rate of return that a firm requires to earn from its projects. Second, it is the minimum rate of return which will at least maintain the market value of the shares. As there is always some business and financial risk involved in investing funds in a firm, cost of capital comprises of following three components:

1. The expected normal rate of return at zero risk level such as the rate of interest allowed by Government on its securities;
2. The premium for business risk and
3. The premium for financial risk on account of pattern of capital structure.

Symbolically cost of capital is represented as:

\[ K = r_0 + b + f \]

Where, \( K \) is cost of capital, \( r_0 \) is normal rate of return at zero risk level, \( b \) is premium for business risk and \( f \) is premium for financial risk.

The term cost of capital defined above is used to convey different senses. It is frequently used to refer to costs of specific sources of capital such as the cost of debt, cost of preference capital and cost of equity capital, etc. It has been now established that it is the composite cost of capital which is more relevant in financial decisions and not the cost of specific source of finance. Therefore, the term cost of capital is used in the composite sense of the weighted average cost of capital.

1.1 Factors Affecting Cost of Capital of a Firm

Cost of capital is the minimum rate of return expected by suppliers of funds to firm. The expected rate of return depends upon the risk characteristics of the firm, risk perception of the investors and a host of other factors. Cost of capital of a firm is influenced by its capital structure, risk free interest rate, business and financial risk, liquidity of investment, age and size of the firm.

**Capital structure** is defined as a relationship between fixed cost funds (debentures and preference share capital) and variable cost funds (equity share capital and retained earnings) having objective of maximization of market value of the firm and minimization of cost of capital. David Durand (1959) has defined the relationship between capital structure and cost of capital in form of two approaches. **Net income approach** states that cost of debt and cost of equity is independent of changes in capital structure. The weighted average cost of capital declines and market value of the firm rises with use of leverage. As per **net operating income approach**, the cost of equity is assumed to increase proportionately with use of leverage. As a result, weighted average cost of capital remains constant and total value of firm remains unchanged with use of
leverage. **Traditional approach** is midway between two approaches. It states that cost of capital declines and value of firm increases with use of leverage up to a prudent debt level and after reaching the optimum point (minimum cost of capital or maximum value of firm) it causes the cost of capital to increase and value of firm to decline. **Modigliani and Miller** in their approach state that due to arbitrage process cost of capital remains invariant to any change in capital structure. The proportion of different sources of financing is decided keeping in view their specific cost of capital with the objective to reduce the overall cost of capital.

The **risk free interest rate** is the interest rate on the risk free and default free securities. Return expected by an investor from a particular security depends upon the market rate of return and risk associated with a particular security.

**Business risk** is defined as variation of EBIT to variation in sales. Higher the risk associated with investment, higher will be the business risk premium and consequently higher will be the cost of capital.

**Financial risk** is defined as variation in firm’s earnings per share to variation in EBIT. Higher the proportion of fixed cost securities in the overall capital structure, greater will be the financial risk and consequently higher will be the cost of capital.

Higher the **liquidity** attached with an investment, lower will be the premium demanded by investors and lower will be the cost of capital of a firm.

**Age** and **size** of a firm play an important role in choice of financing mix and its cost of capital. A firm which is more established and mature in age can raise finance at low cost and has lower cost of capital. Similarly a large sized firm due to its marketability of shares, more diversified nature, less risk and low cost of production has lower cost of capital as compared to a small sized firm.

**Bank rate** and **interest rates on deposits and loans** have been consistently reduced by RBI as a result of financial liberalization in banking sector since 1991. Usually a high interest rate debt is replaced with low interest rate debt by companies to have the advantage of low cost of borrowings. This has effect of reducing the cost of debt, cost of equity capital and overall cost of capital for the companies.
1.2 Computation of Cost of Capital

There is no set procedure for the determination of company’s cost of capital. While measuring cost of capital forecasts are made which are subject to various margin of error. The computed value for cost of capital can therefore be regarded as a fair approximation of the cost. Computation of cost of capital involves two stages:

1. Computation of cost of specific sources of long-term finance i.e. cost of debt, cost of preference share capital, cost of equity capital and cost of retained earnings.

2. Computation of weighted average cost of capital.

1.2.1 Cost of Specific Source of Long-Term Finance

The determination of overall cost of capital (K) requires separate computations of each major long-term source of finance, namely, long-term debt, preference shares, equity and retained earnings.

The cost of specific source of long-term finance is defined as the discount rate that equates the present value of the funds received by firm net of underwriting and floatation costs with the present value of expected outflows. These outflows are in form of interest payments, dividend payments and repayment of principal as the case may be. Determination of cost of various sources of finance is simplified, to a marked extent, by adopting the Porterfield approach of explicit and implicit costs. According to Porterfield, “The explicit cost of any source of capital’s the discount rate that equates the present values of cash inflows that are incremental to the taking of the financing opportunity with the present value of its incremental cost out flows.” The cost of specific source of finance is determined by solving the following equation as given by (Van Horne, 1976):

\[ \text{CLI}_0 - \sum_{t=1}^{n} \frac{C_t}{(1+K)^t} \]

Simplifying we get:

\[ C I_0 = \frac{C_1}{(1 + K)} + \frac{C_2}{(1 + K)^2} + \ldots + \frac{C_n}{(1 + K)^n} \]

Where \( \text{CLI}_0 \) is net amount of funds received by the firm at zero time, \( K \) is cost of capital, \( C_t \) is outflow at the end of year \( t \) and \( n \) is the duration over which the funds are provided.
In addition to the above, different formulas have been given by different authors to measure cost of various individual sources of funds as given below:

- **Cost of Debt**

  Cost of debt for a company is the rate of discount that equates the present value of outflows of cash on account of use of debt with the present value of cash inflows received from the issue of debt capital. Debt issued by a company may be perpetual debt or debt carrying a fixed life (redeemable debt). It has features of face value, coupon rate of interest, floatation costs, issue discount, redemption premium, life in years (redeemable debt) and priority in repayment over preference share capital and equity. The computation of cost of debt is relatively easy particularly when borrowings are from banks, financial institutions or from financial marks. Here cash inflows are net proceeds and cash outflows are interest and principal repayment in installments or in one lumpsum at the time of maturity of the loan. Both the types of cash flows are amenable to accurate forecast and therefore the cost of debt can be determined with a fair degree of precision. However, in case the debt is subject to floating interest rate, forecast of likely interest rates expected to prevail during the period of the loan will be required. In case, interest rates in future turn out to be different from forecast ones, the cost of debt (so determined) is subject to error. The following formula is used to compute cost of debt as given by **Prasanna Chandra (1992)**:

\[
CI_o = \sum_{t=1}^{n} \frac{C_t (1-T)}{(1+K_d)^t} + \frac{R_v}{(1+K_d)^n}
\]

Where \(CI_o\) is net amount of funds received by a firm on debt issue, \(C_t\) is annual interest payment, \(T\) is tax rate. \(R_v\) is the amount repayable at the time of redemption and \(n\) is maturity period of debt.

Interest paid on debt is tax deductible. The higher the interest charges, the lower will be the amount of tax payable by a firm. **Tax rebate on floatation costs** shall be deducted to arrive at net annual interest outflow associated with a debt security (**P.K. Jain, 2000**). **I. M. Pandey (2001)** is following a different approach as far as tax adjustment is concerned and cost of debt before tax is computed by using the equation given below:

\[
CI_o = \frac{C_1}{(1 + K_d)^1} + \frac{C_2}{(1 + K_d)^2} + \frac{C_n}{(1 + K_d)^n}
\]
Where $CI_0$ is net amount of funds received by a firm on debt issue, $C$ represents outflows on account of interest payments over a number of years and $K_{dbt}$ represents cost of debt before tax.

After tax cost of debt is calculated by following formula:

$$K_{dat} = K_{dbt} (1-T)$$

Where $K_{dat}$ represents cost of debt after tax, $K_{dbt}$ refers to cost of debt before tax and $T$ represents the tax rate.

**Cost of Perpetual (Irredeemable Debt)**

Perpetual (Irredeemable) debt is not required to be returned to investors during the lifetime of the company. Alternatively, a firm may have a policy of maintaining a constant amount of debt in the capital structure. The cost of perpetual (Irredeemable) debt is computed with the help of following formula:

$$K_{dat} = \frac{R}{P} (1-t)$$

Where $R$ is annual fixed interest charges, $P$ is net proceeds from the issue of debt, $t$ is effective tax rate and $K_{dat}$ represents cost of debt after tax.

**Cost of Redeemable Debt**

Redeemable debt has to be repaid back to the investors after a certain period. The following formula is used to compute cost of redeemable debt as given by Vanhorne (1976), Hampton (1980) and Pandey (1987):

$$K_d = \frac{R + \frac{1}{n} (F - P)}{\frac{n}{F + P} X (1-t)}$$

Where $F$ is the face value of the debentures, $P$ is the price at which debenture is sold, $n$ is the number of years to maturity and $R$ is the fixed interest charge. $1/n (F-P)$ represents the amortization of premium or discount and is negative, if debentures are issued at premium. $1/2 (F+P)$ reflects the average amount outstanding.
• **Cost of Preferred Stock**

The cost of preferred stock is a function of its stated dividend. The payment of dividend is not contractual obligation of the company. Though the dividend is payable at the discretion of board of directors still it is generally expected that it will be paid regularly. Preference share capital being a hybrid security has neither the ownership privilege of equity nor the legally enforceable provisions of debt. Preference dividend is paid out of after tax profits. Therefore there is no need of tax adjustment for computing the cost of preference share capital. Preference share capital issued by a company may be perpetual security or security issued with a maturity date (i.e. redeemable preference share). The cost of preference share capital as per formula given by Prasanna Chandra (1992) is as follows:

\[
CI_o = \sum_{t=1}^{n} \frac{Dt}{(1+K_p)t} + \frac{R_v}{(1+K_p)^n}
\]

Where \(CI_o\) is net amount of funds received by a firm on issue of preference share capital, \(D\) represents preference dividend payable annually, \(R_v\) is the redemption value and \(K_p\) represents cost of preference share capital.

**Cost of Irredeemable Preference Capital**

Irredeemable preference share capital is not required to be repaid back to investors during the life time of the company. The cost of preference share capital which is perpetual is computed with the help of following equation:

\[
K_p = \frac{D_p}{P}
\]

Where \(K_p\) is the cost of preference share capital, \(D_p\) represents preference dividend and \(P\) represents the net proceeds of the preferred stock issue.

**An approximation:** The cost of preference share capital when it is issued at discount or premium is computed with the help of following equation:

\[
K_p = \frac{D_i + \frac{1}{n}(F - P)}{\frac{F + P}{2}}
\]
Where \( F \) is the face value of the preference shares, \( P \) is the price at which it is sold, \( n \) is the number of years to maturity and \( D_1 \) represents preference dividend. \( 1/n \) \((F-P)\) represents the amortization of premium or discount and is negative if preference shares are issued at premium. \( \frac{1}{2} (F+P) \) reflects the average amount outstanding.

**Cost of Equity Capital**

The rate of return required by suppliers of debt capital and preference capital can be ascertained easily because the benefits expected by them can be defined with near certainty. The estimation of the rate of return required by the equity shareholders however is difficult because the benefits expected by them cannot be measured easily. There is no legal binding on a company to pay dividends to its equity shareholders. Thus the estimates of the amount and timing of the cash flows expected by equity shareholders are more uncertain. The earnings and dividends on equity shares are generally expected to grow unlike the interest on bonds and preference dividends. This feature of variable dividends on equity shares makes the calculation of cost of equity capital \((K_e)\) difficult.

**Dividend Capitalization Approach**

The value of a share today depends upon the cash flows expected by investors and risk associated with those cash inflows. Cash inflows expected from an equity share consist of dividends that the owner expects to receive while holding the share and the price which he expects to receive when the share is sold. The value of an ordinary share is determined by capitalizing the future dividend stream at the opportunity cost of capital. The opportunity cost of capital is the return that the shareholders could earn from an investment of equivalent risk in the market. The value of a share is the present value of its future stream of dividends.

**Single Period Valuation**

If the investor intends to buy a share and hold it for one year then the present value of the share today i.e. \( P_0 \) will be determined as the present value of expected dividend per share at the end of the first year, \( D_1V_1 \), plus the present value of the expected price of the share after a year, \( P_1 \).
\[ P_0 = \frac{D_1}{1 + K_e} + P_1 \]

Simplifying the equation:

\[ K_e = \frac{D_1}{P_0} + g \]

\[ K_e = \text{Cost of equity capital.} \]
\[ D_1 = \text{Dividend per share expected at the end of the year.} \]
\[ P_o = \text{Average market price (Simple average of high and low prices) at the end of previous year.} \]
\[ g = \text{Growth in dividend per share.} \]

**Multi-period Valuation**

When the investor holds the share for more than one year then the price next year \((P_1)\) will depend on expected dividend in year 2 and expected price of the share at the end of the year 2 and so on. Since the equity shares have no maturity period, they are expected to earn dividends for an infinite duration. Today price \((P_o)\) can be calculated as the discounted value of dividends in year 1, 2 and so on and liquidating price at the end of year \(n\). The formula to compute price of share for today is as follows:

\[ P_o = \frac{D_1}{(1 + K_e)} + \frac{D_2}{(1 + K_e)^2} + \ldots + \frac{D_n + P_n}{(1 + K_e)^n} = \sum_{t=1}^{n} \frac{D_t}{(1 + K_e)^t} + \frac{P_n}{(1 + K_e)^n} \]

The following approaches are used for computing cost of equity capital \((K_e)\) under multi-period valuation model:

**Constant Dividend Approach**

As per this approach cost of equity capital \((K_e)\) is the rate of discount which equates the present value of future stream of dividends per equity share with current market price of a share. The cost of equity capital \((K_e)\) under this approach has been
computed by following formula:

\[ K_e = \frac{D_1}{P_o} \]

Where

- \( K_e \) = Cost of equity capital.
- \( D_1 \) = Dividend per share expected at the end of the year.
- \( P_o \) = Average market price (Simple average of high and low prices) at the end of previous year.

This approach of computing cost of equity capital \( (K_e) \) is based upon following assumptions:

1. Shareholders give prime importance to dividends.
2. Risk of the firm remains unchanged.
3. Dividend per share remains the same.

**Dividend Yield with Growth in Dividends**

The dividend approach does not take care of future growth in the rate of dividend. In actual practice, shareholders expect growing rate of dividend on their investment. In a situation, where dividends are expected to grow at constant rate of \( g \) percent for ever, then the cost of equity capital \( (K_e) \) is computed by following formula:

\[ K_e = \frac{D_1}{P_o} + g \]

Where

- \( K_e \) = Cost of equity capital.
- \( D_1 \) = Dividend per share expected at the end of the year.
- \( P_o \) = Average market price (Simple average of high and low prices) at the end of previous year.
- \( g \) = Growth in dividend per share.
Realized Yield Approach

According to this approach, the yield (rate of return) realized by equity shareholders historically is regarded as a proxy for the rate of return required by them. The rate of return on equity share is computed by following equation:

\[ Y_t = \frac{D_t + P_t}{P_{t-1}} - 1 \]

Where

\[ Y_t = \text{Yield for year } t. \]
\[ D_t = \text{Dividend per share for year } t \text{ payable at the end of the year.} \]
\[ P_t = \text{Price per share at the end of year } t. \]
\[ P_{t-1} = \text{Price per share at the end of year } t-1 \text{ that is at the beginning of year } t. \]

The yield for an n-year period is

\[ (W_1 \times W_2 \times \ldots \times W_n)^{1/n} - 1 \]

Where

\[ W_1 = \frac{D_1 + P_1}{P_0} \]
\[ W_2 = \frac{D_2 + P_2}{P_1} \]
\[ W_n = \frac{D_n + P_n}{P_{n-1}} \]

The assumptions of realized yield approach are as follows:

1. The yield earned by investors has been on average in conformity with their expectations.
2. The future expectations of investors are similar to their past expectations.

These assumptions seem to be unrealistic as in general changes in anticipated inflation rate and interest rate structure usually result in the revision of the rate of return required by equity investors. The historical yield figure however can serve as a useful starting point for the estimation exercise.
**Bond Yield Plus Risk Premium Approach**

According to this approach the rate of return required by the equity investors of a firm is equal to:

Yield on the long-term bonds of the firm + Risk Premium

As per this approach, equity investors bear a higher degree of risk than bond investors and the required rate of return should include premium for the higher risk. The problem of this approach is how to determine the risk premium. Most analysts consider operating risk and financial risk affecting the business and arrive at a subjectively determined risk premium figure. This is added to the yield on the long-term bonds to estimate the rate of return required by equity investors.

**Earnings Model**

As per earnings model, cost of equity capital \( (K_e) \) is the rate of discount which equates the present value of future stream of earnings per share with the current market price of equity share. Symbolically:

\[
K_e = \frac{\text{EPS}_1}{P_o}
\]

Where

- \( K_e \) = Cost of equity capital.
- \( \text{EPS}_1 \) = Earnings per share expected at the end of the year.
- \( P_o \) = Average market price (Simple average of high and low prices) at the end of previous year.

E/P ratio approach of computing cost of equity capital \( (K_e) \) is based upon following assumptions:

i. Earnings per share are expected to remain constant in future.

ii. Market price of equity share depends upon earning per share.

iii. The firm can earn on the new projects at the same rate which it earns on the existing projects.
Earnings Model with Growth in Earnings

The earnings of a company are expected to grow in future. If the earnings per share of a company are expected to grow at a constant rate of growth then the cost of equity capital (\(K_e\)) is computed by following formula:

\[
K_e = \frac{EPS_1}{P_o} + g
\]

Where

- \(K_e\) = Cost of equity capital.
- \(EPS_1\) = Dividend per share expected at the end of the year.
- \(P_o\) = Average market price (Simple average of high and low prices) at the end of previous year.
- \(g\) = Growth in dividend per share.

Capital Asset Pricing Model

There is another approach for computation of cost of equity capital (\(K_e\)) such as capital asset pricing model. As per this approach return expected by an investor from a particular security is equal to:

Expected Return = Risk Free Rate + Risk Premium

The amount of risk premium demanded by investor is computed by following equation:

Risk Premium = (Market Return – Risk Free Rate) Beta

\[
= (R_m - R_f) \beta_i
\]

The required return on a particular security is calculated by following formula:

\[
R_i = R_f + (R_m - R_f) \beta_i
\]

Where \(R_i\) is return expected by a investor from a particular security. \(R_m\) is expected market return, \(R_f\) is the risk free rate of return and \(\beta_i\) is the security’s beta.
The cost of equity of firm \((Ke)\) is equal to:

\[
Ke = R_f + (R_m - R_f) \beta_i
\]

As per this method, there exists a linear relationship between expected return and risk. Higher the risk (as measured by beta), the higher will be expected return and then higher will be the cost of equity capital \((K_e)\).

- **Cost of Retained Earnings**

  There is no agreement amongst different authors of finance regarding the need for calculation of cost of retained earnings. Some authors argue that there is no need to compute cost of retained earnings \((Kr)\) separately as it is already included in cost of equity capital \((Ke)\). For the purpose of computing cost of equity capital \((Ke)\) the investment in the equity share at time 0, which is taken as \((P_o)\) is matched against all possible benefits resulting from the investment in shares such as dividend income and appreciation in the share value. A shareholder has claim against both the dividend income and retained earnings. Thus the cost of retained earnings is included in cost of equity capital \((K_e)\) and hence there is no justification for computing cost of retained earnings \((Kr)\) separately.

  However there are many others who advocate that retained earnings are not cost free. Though they do not have any explicit cost to the firm but they involve an opportunity cost. The opportunity cost of retained earnings (internal equity) is the rate of return on dividends foregone by the shareholders. The cost of retained earnings \((Kr)\) will be equal to cost of equity capital \((Ke)\) in the absence of personal taxation and brokerage cost. It implies that if dividend is paid to equity shareholders, they would invest such dividend in equity shares of other companies which have same risk return characteristics. However in reality these two assumptions are not satisfied. Shareholders are required to pay tax on dividend income. They also have to pay brokerage cost when they invest dividend income elsewhere. In the presence of personal taxation and brokerage cost, the cost of retained earnings \((Kr)\) is computed with the help of following equation:

\[
Kr = Ke (1-t) (1-b)
\]
Where

\[ K_r = \text{Cost of retained earnings.} \]
\[ K_e = \text{Cost of equity capital.} \]
\[ t = \text{Personal tax rate of the shareholders} \]
\[ b = \text{Percentage brokerage cost} \]

Shareholders are an heterogeneous group. Different shareholders have different income levels and are subject to different income tax rates. So it is difficult to determine single tax rate applicable to shareholders. Therefore, in the absence of information with respect to income tax rate and brokerage cost, cost of retained earnings is taken as equal to cost of external equity in the present study.

1.2.2 Weighted Average Cost of Capital

After the cost of each specific source of finance is computed, the next step is to calculate weighted average cost of capital. The weighted average cost of capital can be computed by summing up the specific cost of debt, cost of preference share capital, cost of equity capital and cost of retained earnings, each weighted by its proportion in the total capitalization of the firm. Weighted average cost of capital is computed with the help of following equation:

\[ K_c = K_{dat}W_d + K_pW_p + K_eW_e + K_rW_r \]

Where, \( K_{dat}, K_p, K_e \) and \( K_r \) represents cost of debt after tax, cost of preference share capital, cost of equity capital and cost of retained earnings respectively while \( W_d, W_p, W_e \) and \( W_r \) represent weights attached to each specific source of capital respectively.

The most significant role of cost of capital lies in its use in investment decision making. Here the relevant cost is cost of raising new funds to finance the project not the historical cost. As the volume of financing increases, the costs of various types of financing sources will increase, thereby raising the firm’s weighted average cost of capital. These increasing costs are attributable to the fact that suppliers of capital—long term debt, preference shares and equity shares will require greater returns in order to
compensate themselves for the increased risk due to large volumes of new financing. The cost of each incremental or new source of finance is known as marginal cost of capital. When project is financed with more than one source of finance then the weighted average cost of incremental financing is called weighted marginal cost of capital and is used for evaluation of investment proposals by a company.